



TRAINING PLAN

Version 4

October 28, 2007

*THE NEXT GENERATION OF
INTEROPERABILITY RADIO*



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1 Introduction

1.1 Training Plan Overview

The wide ranging nature of the Interoperability Montana Project will present significant challenges to training responders and system users across the state. The sheer geographic size of the State of Montana, the 56 counties and 7 tribal nations give an idea of the scope of this effort.

One of the primary needs for training is the introduction of a new paradigm of radio communication in the state. The wide area trunking system brings new capabilities that allow users to communicate in ways that were not even possible through conventional VHF.

This training plan is being developed during the rollout of the first phases of the Interoperability Montana (IM) Project. Initial courses and planning will focus on those needs with the perspective that the plan will be used as the system is rolled out across the state.

Training and Development is a Process

This training plan is not intended to be the end, but rather the means to starting training. The plan is a general guide and is intended to help implement training programs. Learning is an ongoing process.

1.2 History of the Interoperability Montana Project

The Interoperability Montana Project is a partnership of local, tribal, state and federal response agencies committed to improving and expanding interoperable communications throughout Montana. The partners are divided into three main categories: 1) Regional Consortia (representing local and tribal interests); 2) State of Montana Agencies (representing all levels of state radio users); 3) Federal and Private Partnerships.

The IM Project consists of eight consortia and one mobile data terminal consortium, each with one voting membership on the board of Interoperability Montana Project Directors (IMPD). As part of the IM Project, each of these consortium have agreed to work together and advance the development of interoperable communications infrastructure according to the priorities and funding established by the IMPD. The IMPD is a dynamic, cohesive group dedicated to the deployment of Montana wide communications interoperability for public safety responders.

The majority of Montana's existing public safety voice radio systems rely on 30 year-old technology. The IM Project addresses the interoperable public safety communication system needs of the eight county consortiums as well as state and federal agencies in the State of Montana.



The improved ability of all local, tribal, state, and federal public safety responders to communicate among and within these counties will provide citizens of Montana with an emergency responder force better able to protect them in the case of a disaster, whether natural or manmade. This is in keeping with the goals of the federal Homeland Security Agency that has supplied much of the funding for the project to date.

1.3 Training Motivation

With the introduction of new technology for interoperable radio communications comes the need for training on that new technology and any associated changes in operating procedures. The deployment of the first two Concept Demonstration Projects (CDP1 and CDP2) resulted in the deployment of a vast new radio system spanning the region surrounding Lewis and Clark County and the Northern Tier project which covers the entire 565 mile border with Canada and south for roughly 75 miles.

The training for this and any other new system of this size requires the careful identifications of training needs and a careful coordination with users so their training is received in a timely manner, but not too far in advance of the deployment of the new system.

Training must also be tailored to the users receiving training. A dispatch person, for example, does not need the same training as a law enforcement officer in the field, who may require different training than a Fire Chief. As a result, this Training Plan is structured in modules that can be combined in ways to most effectively meet the training needs of all targeted users.

In CDP1 it was pointed out that without recurring training, people will fall back to old habits. Recurring training is critical to effective ongoing operations of the new system.

1.4 Training Goals

Each person receiving training on the new Interoperability Montana radio system is there because they have an identified need to use that equipment in an effective, efficient, and coordinated manner. Although similar to equipment used in the past, the new equipment is different enough, and the Standard Operating Procedures (SOPs) can be different enough that simply picking it up and using it without training will not be sufficient, particularly in an emergency.

Each person receiving training will not only be required to learn how to operate the new equipment, but will also need to learn about any changes in SOPs that have been identified by each jurisdiction receiving training. In reality, the new equipment, once the initial learning curve is overcome, should be easier to use than the old, in the sense that more of the mundane tasks



(such as selecting a repeater) are done automatically for the user, without their awareness that these tasks are being performed.

Each user will be successfully trained if they leave training knowing the basic operation of the equipment they must deal with, along with the basic SOPs. It is never really possible for a person to leave a training knowing every and all aspects of the subject being trained upon. It is, however, possible to leave training knowing the basic operating principles, and where to find the answers to subsequent questions. With this in mind, the training program includes the reference materials necessary to provide the trainees with the resources they will require to meet their future information requirements.



2 Training Methodology

2.1 Trainer Roles

Trainers will be developed from local users who have an interest in the technology and the people who use it. They understand the system, how to experiment with it, and then be able to adapt the new capabilities with their SOPs and then share the information with their peers. It will be critical for this trainer role to bring coordination between the PSAP and field level responders.

One of the first tasks to be performed as part of the development of the training program is to recruit and select who the trainers are going to be. The first tier of trainers will consist of that trainer, or those trainers, who will “train the trainers.” The second tier is these trainers who were trained by the first tier and who will subsequently go forth and train the rest of the users across a consortium.

Once trained, the second tier of trainers will contact local agencies and set up a schedule for training. The exact size and geographic diversity of the training to be provided will be determined at a later time.

2.2 Trainee Roles

The following are a list of potential roles that will be associated with a suggested training curriculum shown in matrix form in the next section.

- **Training Manager:** The training manager will be a staff level position within the organization that reports to the IMPD. This person will oversee and coordinate training programs for responders across the state of Montana.
- **Executive:** This group would include County Commissioners, Tribal Council Members, Consortia Board Representatives, Sheriffs, City Police Chiefs, Fire Chiefs, State Agency Administrators, Federal Partners, etc.
- **Responder:** This group would include anyone who responds to incidents and uses the two way radio communication for that purpose.
- **Dispatch:** This group involves anyone who works in a dispatch center.
- **System Admin:** This group involves anyone who will be included in management of the trunked radio system, the network that supports the system or programs radio equipment.
- **Communication Manager:** This group involves people who oversee groups of people using the system or who define any type of standard operating procedures. This could include 911 Coordinators, Police Captains, EMS coordinators, Fire Captains, etc.



2.3 Course Information

The following table contains a list of potential course titles grouped into modules that can be directed to specific roles and attendees. Additional and more detailed individual courses will be identified and added to this list as the program moves forward.

The timeline for these courses would have to be evaluated at the operational department level to limit costs in both dollars and time. An organization training manager would select minimum course requirements for their organization.

Course descriptions would be created as an appendix to this plan.

Categorized Courses	Descriptions	Roles				
x = Mandatory o = Optional		Executive	Responder	Dispatch	Sys Admin	Comm Mgr
Fundamentals						
Radio Fundamentals		X	X	X	X	X
Trunking Fundamentals		X	X	X	X	X
Radio Programming					X	X
Standard Operating Procedures		O	X	X	X	X
Dispatch		O	X	X	X	X
Mutual Aid Channels		O	X	X	X	X
Encryption		O	X	X	X	X
NIMS Fundamentals		X	X	X	X	X
Responders and Interoperability						
Local Standard Operating Procedures		X	X	X	X	X
Statewide Standard Operating Procedures		X	X	X	X	X
System Administration						
Trunking System Administration				X	X	X
Fleetmapping				X	X	X
Programming Radios					X	X
Network Management					X	X
Network Monitoring					X	X



Maintenance						
So You Are The New Site Manager...						X
Advanced Dispatch						
Consoles				X	X	X
Advanced Trunking Capabilities				X	X	X
Continuing Education and Advanced Classes						
After Action Reporting and SOP Updates		X	X	X	X	X

2.4 Training Options and Guidelines

Setting up and conducting training should be categorized into two areas: academic training and operations training. The academic training would provide field users and others an overview of the more technical aspects of the program. This could include a laymen's view of system administration, radio programming, networking, etc. Operational training would focus responders on how they use the radios rather than on how the system works.

2.5 Training Matrix, Sequence and Optional Locations

Notice the key and how to determine which course is required for which position; optional courses would be taken depending on region, funding, time, and management.

Once the preliminary courses have been completed, each trainee must follow up with more thorough training in order to become a certified user. Another alternative is to bypass the basic courses and complete the advanced courses in their entirety. Completing this course work depends upon available time and experience required in order to do the job.

What has been identified a critical component of this training plan is the need for responders to go through continuing education classes on the system. Based on the feedback from CDP1 it was felt that follow up training should take place twice per year. It was suggested that this take place in the spring and fall of the year for every responder.

After Action Reports need to be completed for major incidents. These reports can then be used to refine standard operating procedures and ultimately be taken back to responders who are involved in a particular type of incident.

The following is a list of options for where classes could be conducted:

- Community Colleges



- Fire Training School
- Law Enforcement Academy

The follow is a sample list of organizations that can help with providing courses, content and resources:

- MSPOA
- DNRC
- MACOP
- MPPA
- FCA

2.6 SOP Breakout Sessions

Without recurring training on standard operating procedures responders will fall back to old habits and methods of communication. This may limit their ability to interact with regional, state and federal agencies. Exercises have been identified as one of the most effective methods of training due to the hands on nature of the training.

To be most efficient, it might be advisable to try to combine some of the above mentioning trainings into a general training related to the discipline, and then have breakout sessions where differing SOPs are trained on by locals familiar with their respective SOPs:

Cost may be a hindrance to the training process. Not just in dollars, but with volunteers the cost is measured in time. In any case the training manager and departmental communication managers will have to create more detailed training plans that balance out the need for training with the availability of resources and funding.

2.7 Curriculum Options per Discipline

The training materials to be developed for each of the courses listed above will include the following modules:

1. Common – Required training common to everyone receiving training
2. Dispatch – Training unique to Dispatch, if any
3. Law Enforcement – Training unique to LE, if any
4. Fire – Training unique to Fire, if any
5. EMS – Training unique to EMS, if any
6. Public Works – Training unique to PW, if any
7. MHP – Training unique to MHP, if any
8. Dept. Transportation – Training unique to MDT, if any
9. DOC – Training unique to DOC, if any
10. DNRC – Training unique to DNRC, if any



3 Training Materials and Logistics

3.1 Materials Development

The primary methodology for training will initially involve a trainer, printed materials, presentations and in-person training sessions. As the program evolves and materials are developed, there is a good possibility that some of the fundamental training could be developed for online or self-paced training and materials.

In any case the strategy for creating the training materials could involve:

- Solicit from users what they feel they need to be trained on.
- Look for sources of training materials, as well as options for on-line courses, teleconference, in person, etc. SAFECOM and other organizations may be able to provide materials and courses.
- Utilize and modify any existing training materials that involve interoperability and SOPs.

While it may be possible to create the training material without soliciting input from future users of the system, giving them the opportunity to provide input will ensure areas of training are not missed. Future users will be tempted to say, “I don’t know the new system so how would I know what I need to be trained on?” This indicates the users are concentrating on the wrong thing. User responses should encompass what it is they need to be able to do to perform their jobs efficiently and successfully. Once this information is returned to the training material developers, they can turn those “what’s” into “how’s” using the new system.

The initial statewide training will be conducted using an instructor led hands-on radio training methodology. Instructor led hands-on radio training provides a combination of classroom training and actual radio usage. This training strategy allows for individualized, personalized attention and motivation from an experienced instructor. Trainee questions can be answered immediately and the user acquires actual hands-on, real-life experience with the system.

Initial training will be conducted using instructor-led lecture classes with hands-on exercises that allow the user to work in the training system. On-line help, handouts, and structured training exercises will be used to supplement the instructor-led classes. Instructors will provide workers with personalized feedback while workers have the opportunity to perform exercises that are related to their daily tasks. Workers will also have the opportunity to bring actual cases to work on during a lab session which will allow for application of the training data to real-life, familiar situations. While instructor led hands-on training is the most effective way to train a large number of users on a new radio system within a specified implementation schedule, a drawback to this methodology is the length of the session. Experience with conducting systems training shows that the effectiveness of classroom training diminishes significantly if the session exceeds one week; however, it is sometimes impossible to train users to the ideal level of proficiency within one week. However, this training methodology combined with other implementation



strategies (i.e., Help Desk, User Manual and on-going training) will mitigate the impact of this disadvantage.

The first training session should be considered a pilot session, with the expectation the training material will be a little rough and needing improvement. Each group of students will be asked for feedback on how the course can be improved, but the first group will be especially important in this regard, providing trainers with the first set of feedback they will receive.

Effective communication both prior to and during the initial statewide implementation is one important element in a smooth introduction.

Pre-implementation communication methods will include:

- A Pre-Training Guide will be published and distributed to each user prior to their designated training session. The Pre-Training Guide will highlight certain information (i.e., basic usage, programming, mutual aid). The guide will be accompanied by a cover letter which will include the assigned training date and location, a list of items to bring to training, and training parameters (i.e., dress code).

On-going communication tools will include:

- On-line help and announcements will be used to clarify issues which may result in training and/or to update users about system modifications.

3.2 Visual Aids

Diagrams and graphics, such as the ones below, would be included in the training manual as well showing typical radio controls and programming configuration:



The power of an image is unsurpassed for conveying volumes of information. Several visual aid materials are appropriate for radio communications training beyond the traditional use of slides and overhead transparencies. For introducing equipment, increasing familiarity with features,



and presenting new procedures, videos and photographs serve as enhanced training tools. The use of actual user equipment during training sessions to demonstrate methods or functions interactively can significantly enhance training opportunities. Furthermore, the ability of users to demonstrate problems or difficulties interactively on the actual equipment provides an additional avenue for feedback and instruction. Also, system coverage area maps can be used to identify problem coverage areas for technical investigations and potential corrections.

3.3 Facilities and Equipment

Options for facilities could include working through the current responder training sources such as local community colleges, the Fire Training Program, Law Enforcement academies, and DES training programs.

Depending on whether or not training is local, regional, live, or web cast, there are many options. Facilities and equipment required will depend on the desired means of delivery. Regardless, a live testing version would best support the training of interoperability radio users. A small region of the system will be established to allow interactive training using the new software, providing hands on training for all users during the entire training process. This is necessary for accurate user training and ease of transition into the new system, also allowing trial and error testing without affecting the live system. This region will be active only when scheduled training activities are occurring. In order to simulate the production system, software for training will be copied from the most current version available when training begins. This isolated training region is essential for several reasons:

- The instructors will not have to worry about changes made to modules as training sessions are in progress. This will eliminate the possibility of interruptions to the training process resulting from the migration of load modules into the training environment.
- The instructors will not have to alter their training strategy due to system or database changes made once the training process has been initiated unless necessary.
- It is critical that users develop confidence in the interoperability radio system throughout the training process. Ongoing interruptions due to software changes or lack of data integrity could be detrimental to this goal.



4 Schedule

4.1 *Training-the-Trainer Time Line*

Initial train the trainer programs are being conducted in the Northern Tier at the time of this report. Further training schedules will have to be determined based on the need of local jurisdictions.

4.2 *Trainee Schedule*

Training will occur based on the final system implementation schedule for each region. The overall approach has been designed to minimize any disruptions to the day-to-day activities, yet provide workers with the skills necessary to be able to use their radios immediately after completion of the training curriculum. In other words, no office will have all of the workers being trained at the same time so that some workers remain to cover the day-to-day responsibilities.

4.3 *Rollout Schedule*

The overall approach to training will be designed to minimize any disruptions to the day-to-day work activities, yet provide workers with the skills necessary to be able to use their radio systems immediately after completion of the training curriculum. In other words, no office will have all of the workers being trained at the same time so that some workers remain to cover the day-to-day responsibilities.

5 Budget

5.1 *Training Budget*

The training budget is being prepared with the overall budget for the Interoperability Montana Project Directors staffing and operations. Anticipated completion of this budget is January 2008.



6 Appendices

Appendix A: Training Planning Form Template

Training Plan Template
<p><u>Training Goal</u></p> <p><i>Insert a description of the overall results or capabilities you hope to attain by implementing your training plan.</i></p>
<p><u>Training Schedule</u></p> <p><i>Insert a</i></p>
<p><u>Trainer:</u></p> <p><input type="radio"/></p> <p><u>Trainees:</u></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>
<p><u>Learning Objectives</u></p> <p><i>Insert a description of what you will be able to do as a result of the learning activities in this plan.</i></p>
<p><u>Training Materials and Development</u></p> <p><i>Insert a description of materials that will be required for the training plan.</i></p>



Documentation / Evidence of Learning

Insert a description of the evidence produced during your learning activities -- these are results that someone can see, hear, feel, read, smell, e.g.:

1. *Course grade*
2. *Your written evaluation of your problem solving and decision making approaches*
3. *Etc.*

Evaluation

Assessment and judgment on quality of evidence in order to conclude whether you achieved the learning objectives.



Appendix B: Glossary of Terms

Analog

Whenever a person speaks, sound is projected in the form of a sound wave. These waves move at a certain frequency that determines the pitch of the sound. An analog radio network transmits the actual wave of a person's voice over the air by modulating it onto a radio frequency carrier. An analog network operates differently from a digital network, which converts the vocal sound wave into a digital bit stream of ones and zeros. This information is then sent over the air, and eventually converted back into an analog wave to be heard.

APCO

This stands for The Association of Public Safety Communications Officials. This agency is composed of many different public safety employees and representatives from around the world. APCO was one of the lead agencies in the development of the Project 25 Standard on which our new radio system is based.

Backward Compatibility

This term refers to the capability of a piece of equipment (i.e. software program, hardware component) to be compatible with its predecessor in all forms. For instance, Microsoft Word 2000 is backward compatible since it can create documents that will run in Microsoft Word '97.

Base Station

This term refers to a stationary radio connected to an antenna. The antenna is located where it can transmit into and receive from a geographic area where mobile and portable radios are being operated.

Common Air Interface (CAI)

This refers to the protocol by which handheld and mobile radios communicate with the radio system infrastructure. In modern radio systems this is typically a proprietary format, however the CAI, defined by the Project 25 Standard, makes this an open protocol. This allows different manufacturers' portable and mobile radios to work together on a single radio system.

Console

A console is used by a dispatch operator to communicate with users in the field, to track radio activity, and to coordinate the efforts of various public safety agencies. A typical dispatch position consists of various types of equipment, which along with the radio console includes several different tracking and communication systems, usually running on anywhere from one to five computers. Dispatchers usually operate in a public safety facility, with consoles set up in their individual work areas.

Conventional

A conventional radio network allocates specific frequencies to specific groups of radio users permanently. If nobody in a particular group is transmitting on their assigned frequency, then that channel remains open. This is in contrast to a trunking



network which assigns frequencies to users only when they are needed, which can be more efficient. The Lewis & Clark County network will be a trunking network.

Coverage/Coverage Area

A radio network's coverage area refers to the entire area that gets a strong enough signal from the network for a radio in the field to transmit and receive. Once a signal from a network degrades so badly that it is essentially useless, and all transmissions are bad or impossible, then that area is considered to be out of the coverage area. The coverage area is often called the "footprint" of a network.

Digital

The term "digital" refers to the method of expressing information in one of two different electronic states, which are usually designated as ones or zeros. These ones and zeros form a pattern that can be translated into all kinds of information. Relaying digital information through an electrical system is done by transmitting electronic pulses with one of two distinct electrical charges. These pulses are usually referred to as either "1" or "0", with the "1" pulse usually having a higher voltage, or charge, than the "0" pulse. Electronic equipment such as computers can interpret the information by: a) receiving a set of electronic pulses, b) sensing the different voltages of the pulses, therefore determining whether each pulse is a "1" or a "0", and c) combining many of these ones and zeros to form instructions that tell the computer what to do.

Encryption

Digital transmissions can use encryption to secure information that is being transmitted. The reason this security technique is so effective is because the encrypted transmissions can only be deciphered by a radio with the proper decryption key. This key consists of a software application that is programmed into the authorized radios. With the new network, digital encryption can be incorporated as part of the system as needed.

FCC

This stands for the Federal Communications Commission. This governmental agency decides how frequencies are to be used, as well as who can transmit on them. The FCC sets aside specific amounts of frequencies for public safety transmissions, commercial wireless carriers, television broadcasts, etc. Traditionally, the FCC grants blocks of frequencies to public safety agencies, while commercial carriers must buy a license to transmit from the FCC.

Frequency

All radio networks broadcast their transmissions through antennas on a certain frequency. The number of the frequency refers to the number of times that an electromagnetic wave repeats in the span of one second. With sophisticated electronic equipment, these waves can be engineered to carry large amounts of information over great distances.

Intelligent Site Repeater



An Intelligent Site Repeater is a radio site which utilizes a device called a site controller. This controller can perform all call processing and channel assignment tasks that are required to operate the site's base stations. Intelligent Site Repeaters will be utilized in the new Lewis & Clark radio network.

Interoperability

This term refers to the capability of separate and independent entities to work together seamlessly. The new Lewis & Clark network will promote full interoperability between all participating agencies. This feature is incorporated in our network as part of the Project 25 standard.

Loading

The FCC awards licenses for frequency usage based on an expectation that there will be a minimum number of users on each channel by a certain time. This amount of users per channel is referred to as loading. For instance, if a wireless network builder purchased licensing for 20 channels from the FCC, then the FCC might stipulate that there must be a certain amount of loading, or users per channel, by a certain time. If the network provider does not meet the loading requirements, their license would be returned to the FCC. The FCC does this to provide incentive for carriers to make good use of their purchased frequencies. In the case of a public safety network, the FCC grants channels to government agencies (as opposed to selling them), but still requires a certain amount of loading. When all the channels that have been provided from the FCC cannot handle any additional radio users, the system is referred to as fully loaded.

MDT

An MDT, or Mobile Data Terminal, is a vehicle-mounted keyboard and display that is wirelessly linked to a radio network. An MDT can allow an operator such as a police officer or firefighter to access information from the network, such as missing persons files or driving records. MDT's are primarily used to view information from the network and do not have the capability of operating applications independently from the network.

Mobile

In radio systems, the term mobile is usually used when referring to a vehicle-mounted radio unit. This is different from a portable radio, which refers to a handheld radio.

PTT (Push to Talk)

This term refers to the button on a radio that a user pushes to transmit. When somebody wants to talk over the air, they depress the PTT on their portable radio, mobile radio, or dispatch console, and if there is an available frequency, they will be able to speak over the network. When a user presses the PTT, that is often referred to as "keying" the radio.

PTT (Push to Think)

This term refers to the habit of some radio users who push the button on a radio before they've decided what they want to say, tying up a channel while they figure it out. Don't do this.

Portable



In radio systems, the term portable usually refers to a handheld radio. This is different from a mobile radio, which would refer to a radio mounted inside a vehicle.

Project 25

Project 25 is a set of guidelines developed by radio system users for the purpose of standardizing the method of designing radio telecommunications networks for public safety agencies. Agencies such as APCO, the Association of Public Safety Communications Officials, the National Association of State Telecommunications Directors (NASTD), the Telecommunications Industry Association (TIA), the International Association of Chiefs of Police, several federal agencies and radio manufacturers have all participated in building this important standard. Project 25 ensures that all systems following this standard will meet its five main objectives: to make efficient use of the limited number of available public safety frequencies; to permit interoperability among other Project 25-compliant agencies; to ensure backward compatibility of the network; to create smooth system migration via upgrades, additions, etc.; and to provide the capability for scalable trunked and conventional networks.

Queue

When a radio user tries to make a call, and there are no available frequencies to transmit on, that user's call gets placed in a queue. For the most part, the first user that gets placed into a queue will get to transmit as soon as a frequency becomes available, and any subsequent users in the queue will transmit when their turn arrives.

Radio

This term takes on multiple meanings when applied to a communications system. When the term radio is used, it can refer to any of the following: a portable device used to transmit audio, a base station at a transmit site that contains electronic equipment, electromagnetic waves in the air which carry a network's information, or any device used to receive and/or transmit information across a medium.

Repeater

A repeater is a piece of equipment that acts as a transmitter and a receiver. In a radio communications system, repeaters are used to extend the coverage of a wireless transmission. The repeater accomplishes this by first receiving a signal that has been transmitted from some other location, then amplifying and re-transmitting that signal from an antenna, thus giving the original transmission a boost.

Simulcast

A radio network that is simulcast transmits information from each of its transmission sites simultaneously. This means that when a radio user transmits from his/her radio, that transmission is rebroadcast from every tower or antenna that is part of the simulcast system. Because of this technique, any radio can pick up any transmission, regardless of its location.

Site

Also called transmit site, cell site, radio site, or antenna site. Any radio network transmits and receives its signals through antennas that are placed strategically in different locations throughout their desired coverage area. These places are called



sites. Usually the antennas at these sites are mounted high above ground on towers or on the sides of buildings. The Lewis & Clark County network will utilize approximately 11 radio sites, including sites on Stonewall Mountain and MacDonald Pass.

Talkgroup

A talkgroup is a group of radio users that are linked to each other through the radio system. For instance, if any member of a talkgroup initiates a call, any member of that group will hear that transmission. The Lewis & Clark County network will incorporate many different talkgroups, and the users in these groups will be able to interact with the members of their own group as well as monitor other talkgroups throughout the network.

Traffic

This term refers to the number of transmissions being made on the network at any given moment. Although most networks are designed to function even when very busy, an excess of traffic on a network may cause some radios to be placed in a queue when trying to transmit. Comprehensive traffic projections have been taken into account while designing the new Lewis & Clark County network, and since this network provides radio coverage to public safety agencies, the standards have been raised much higher than that of commercial wireless provider.

Trunking

This term refers to a type of communications system that draws from a pool of available frequencies, and assigns them only when they are needed. For example, in the trunked network, when a radio user wishes to talk over the air, they push their transmit button and the system dedicates a frequency to broadcast that user's transmission. After the user lets go of the transmit button, the system can reassign that same frequency to a completely different radio. Trunking is different from a conventional radio network, which assigns one dedicated frequency to a group of radios indefinitely. In a conventional system, if nobody in a particular group is transmitting, their assigned frequency sits unused and is essentially wasted. Trunking can be more efficient, since any available frequency can be used whenever it is needed.

Vocoder

This piece of equipment transforms the sound of a person's voice into a stream of digital information. It also reverses the process converting digital information back to voice. The vocoder is vital to the operation of a digital network, since without it, no audio transmissions could be sent or understood.